***DEPARTMENT OF HUMAN NUTRITION AND DIETETICS***

 ***ABBASS AISHAT MODUPEOLA***

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***COURSE CODE: NTD 206***

***ASSIGNMENT***

***Discuss Calcium as a macronutrient***

 **Calcium is a nutrient that all living organisms need, including humans. It is the most abundant mineral in the body, and it is vital for bone health. Humans need calcium to build and maintain strong bones, and**[**99%**](https://ods.od.nih.gov/factsheets/Calcium-HealthProfessional/)**of the body’s calcium is in the bones and teeth. It is also necessary for maintaining healthy communication between the brain and other parts of the body. It plays a role in muscle movement and cardiovascular function. Calcium occurs naturally in many foods, and food manufacturers add it to certain products. Supplements are also available. Alongside calcium, people also need vitamin D, as this vitamin helps the body absorb calcium. Vitamin D comes from fish oil, fortified dairy products, and exposure to sunlight.**

***Food* *Sources***

 **The following are good sources: Milk, Yoghurt, fortified dairy alternatives, such as soy milk, sardines and salmon, cheese, tofu, green leafy vegetables, such as broccoli, turnip leaves, watercress, and kale, many fortified breakfast cereals, fortified fruit juices.**

***Why* *we* *need* *calcium***

* ***Bone health:* Calcium is essential for the development, growth, and maintenance of bone. As children grow, calcium contributes to the development of their bones. After a person stops growing, calcium continues to help maintain the bones and slow down bone density loss, which is a natural part of the aging process.**
* ***Muscle Contraction:* Calcium helps regulate muscle contraction. When a nerve stimulates a muscle, the body releases calcium. The calcium helps the proteins in muscle carry out the work of contraction. When the body pumps the calcium out of the muscle, the muscle will relax. Calcium is a co-factor for many enzymes. Without calcium, some key enzymes cannot work efficiently.**
* ***Cardiovascular system:* Calcium play a key role in blood clotting. Calcium’s role in muscle function includes maintaining the action of the heart muscle. Calcium relaxes the smooth muscle that surrounds blood vessels. Vitamin D is also essential for bone health, and it helps the body absorb calcium**
* **Calcium can result in improved cholesterol values.**
* **Calcium helps your body with sending and receiving nerve signals**
* **Calcium helps in releasing hormones and other chemicals**

***Factors affecting the absorption of calcium***

* ***High levels of sodium:* Excessive salt can interfere with calcium absorption. Read more about**[**salt and the health of your bones**](https://americanbonehealth.org/nutrition/sodium-and-bone-health/?highlight=salt)**.**
* ***Insufficient vitamin D:* Vitamin D is critical to regulating calcium absorption.**
* ***Coffee (and tea) consumption:* The caffeine in coffee, tea, as well as most sodas acts as a mild diuretic, so that valuable calcium is excreted before the body can make use of it. Consuming these drinks in small quantities is relatively harmless, but excessive use can lead to reduced absorption.**
* ***Smoking:*** [**Studies of smokers**](http://onlinelibrary.wiley.com/doi/10.1359/jbmr.1999.14.2.215/abstract)**show reduced bone mass. The reason is not well understood, but it appears that smoking interferes with the absorption of calcium in the intestines.**
* **Other factors, such as an inactive lifestyle and a diet that features a large amount of meat, may also affect your ability to absorb calcium.**
* ***Presence of free fatty acids:* When fat absorption is impaired, the the unabsorbed fatty acids reacts with free calcium to form insoluble calcium soaps. Calcium absorption is thus interfered with.**
* ***Proteins in diets:* These facilitates calcium absorption because amino acid salts of calcium are more soluble in aqueous solution of amino acids.**

***Hypocalcemia***

 Inadequate **calcium intake** causes osteopenia which if untreated can lead to osteoporosis. The risk of bone fractures also increases, especially in older individuals. **Calcium** deficiency can also cause rickets, though it is more commonly associated with vitamin D deficiency. When you don’t get enough calcium, you increase your risk of developing disorders like: osteoporosis, osteopenia, calcium deficiency disease (hypocalcemia) . Children who don’t get enough calcium may not grow to their full potential height as adults.

***What*** ***causes*** ***hypocalcaemia***?

 Many people are at an increased risk for calcium deficiency as they age. This deficiency may be due to a variety of factors, including:

* poor calcium intake over a long period of time, especially in childhood
* medications that may decrease calcium absorption
* dietary intolerance to foods rich in calcium
* hormonal changes, especially in women
* certain genetic factors.

Other causes of hypocalcaemia include malnutrition and malabsorption. Malnutrition is when you’re not getting enough nutrients, while malabsorption is when your body can’t absorb the vitamins and minerals you need from the food you eat.

***Hypercalcaemia***

Hypercalcaemia is a condition in which the calcium level in your blood is above normal. Too much calcium in your blood can weaken your bones, create kidney stones, and interfere with how your heart and brain work.

Hypercalcemia is usually a result of overactive parathyroid glands. These four tiny glands are situated in the neck, near the thyroid gland. Other causes of hypercalcaemia include cancer, certain other medical disorders, some medications, and taking too much of calcium and vitamin D supplements.

***What causes Hypercalcaemia?***

Hypercalcemia is caused by:

* **Overactive parathyroid glands (hyperparathyroidism).** This most common cause of hypercalcemia can stem from a small, noncancerous (benign) tumour or enlargement of one or more of the four parathyroid glands.
* **Cancer.** Lung cancer and breast cancer, as well as some blood cancers, can increase your risk of hypercalcemia. Spread of cancer (metastasis) to your bones also increases your risk.
* **Other diseases.** Certain diseases, such as tuberculosis and sarcoidosis, can raise blood levels of vitamin D, which stimulates your digestive tract to absorb more calcium.
* **Severe dehydration.** A common cause of mild or transient hypercalcemia is dehydration. Having less fluid in your blood causes a rise in calcium concentrations.
* **Medications.** Certain drugs — such as lithium, used to treat bipolar disorder — might increase the release of parathyroid hormone.
* **Supplements.** Taking excessive amounts of calcium or vitamin D supplements over time can raise calcium levels in your blood above normal